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EXAMINER	
LE, LANA N	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/817,541	Applicant(s) TRACHEWSKY ET AL.	
	Examiner Lana N. Le	Art Unit 2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-6,9-13,15,17-19,21,23 and 25-27* is/are rejected.

7)☒ Claim(s) *2, 7-8,14, 16, 20, 22, 24, 28* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> **A person shall be entitled to a patent unless –**
>
> **(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.**

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1, 4, 5, 9-10, 13, 15, 17, 19, 21, 23 and 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Sugar et al (US 2003/0,203,743).

Regarding claim 1, Sugar et al disclose a multimode wireless communication device (fig. 4; para. 48) comprises digital baseband processing module (790, 795) operably coupled to convert outbound data into outbound digital baseband signals and to convert inbound digital baseband signals into inbound data (para. 71);

analog to digital converter module (end of para. 55, ADCs connected to 336 and 366; para. 56; see blocks 710 and 720 of fig. 11) operably coupled to convert inbound

analog baseband signals (BB signals after direct mixer 320, 322, 350, 352) into the inbound digital baseband signals (at output of ADCs) (para. 71);

digital to analog converter module (DACs 720, 730 of fig. 11) operably coupled to convert the outbound digital baseband signals (from baseband section) into outbound analog baseband signals (analog baseband signals at input of 32, 33);

first radio section (380, 382, 384, 410, 412, 386, 390, 420, 414, 416, 420) operably coupled to convert the outbound analog baseband signals (analog bb signals at input of 380, 382, 410, 412) into first outbound radio frequency (RFB1 signals of first band) signals (at output of antenna 102; fig. 5) and to convert (via 320, 322, 350, 352) first inbound RF signals (RFB1) into the inbound analog baseband signals (analog bb signals before ADC; end of para. 55) when the wireless communication device is in a first mode of operation (received within first band; para. 48); and

a second radio section (380, 382, 384, 410, 412, 414, 388, 392, 418, 422) operably coupled to convert the outbound analog baseband signals into second outbound RF signals and to convert second inbound RF signals (RFB2 signals) into the inbound analog baseband signals when the wireless communication device is in a second mode of operation (received within 2[nd] band; para. 48).

Regarding claim 4, Sugar et al disclose the multimode wireless communication device of claim 1 further comprises: the analog to digital converter module, the digital to analog converter module, and the digital baseband processing module being in a first integrated circuit (end of para. 71); the first radio section being in a second integrated

circuit (1^{st} radio transceiver IC); and the second radio section being in a third integrated circuit (2^{nd} radio transceiver IC) (fig. 9).

Regarding claim 9, Sugar et al disclose the multimode wireless communication device of claim 1 comprises the analog to digital converter module, the digital to analog converter module, the digital baseband processing module, and the first radio section being in a first integrated circuit (wherein baseband IC and the 1^{st} radio transceiver may be on the same IC or may be separate IC) (para. 64; fig. 9); and the second radio section being in a second integrated circuit (2^{nd} radio transceiver IC).

Regarding claim 15, Sugar et al disclose a multimode wireless communication device (figs. 2-5; para. 48) comprises:

a first integrated circuit (660; fig. 9) that includes: digital baseband processing module (790, 795) operably coupled to convert outbound data into outbound digital baseband signals (via 780) and to convert inbound digital baseband signals (received I, Q signal) into inbound data (output data of 790);

analog to digital converter module (710, 720; figs. 11) operably coupled to convert inbound analog baseband signals into the inbound digital baseband signals (end of para. 55, para. 56);

digital to analog converter module (DACs of fig. 3; 730, 740 of fig. 11) operably coupled to convert the outbound digital baseband signals into outbound analog baseband signals (para. 71); and

first radio section (380, 382, 384, 410, 412, 386, 390, 420, 414, 416, 420; fig. 4) operably coupled to convert the outbound analog baseband signals (analog bb signals

at input of 380, 382, 410, 412) into first outbound radio frequency (RFB1 signals of first band) signals (at output of antenna 102; fig. 5) and to convert (via 320, 322, 350, 352) first inbound RF signals (RFB1) into the inbound analog baseband signals (analog bb signals before ADC; end of para. 55) when the wireless communication device is in a first mode of operation (received within first band; para. 48) (wherein baseband IC and the 1st radio transceiver may be on the same IC or may be separate IC) (para. 64; fig. 9); and

a second integrated circuit (2nd transceiver IC shown; fig. 9) that includes a a second radio section (380, 382, 384, 410, 412, 414, 388, 392, 418, 422) operably coupled to convert the outbound analog baseband signals into second outbound RF signals and to convert second inbound RF signals (RFB2 signals) into the inbound analog baseband signals when the wireless communication device is in a second mode of operation (received within 2nd band; para. 48).

Regarding claim 17, Sugar et al disclose the multimode wireless communication device of claim 15, wherein the first integrated circuit further comprises: a control interface (control signals to band select switch; fig. 9) operably coupled to the second and third integrated circuits (1st and 2nd radio transceiver IC), wherein the control interface carries control signals to include the first or second mode of operation (1st or 2nd band operation).

Regarding claim 21, Sugar et al disclose a multimode wireless communication device (figs. 2-5; para. 48) comprises:

a first integrated circuit (660; fig. 9) that includes: digital baseband processing module (790, 795) operably coupled to convert outbound data into outbound digital baseband signals (via 780) and to convert inbound digital baseband signals (received I, Q signal) into inbound data (output data of 790);

analog to digital converter module (710, 720; figs. 11) operably coupled to convert inbound analog baseband signals into the inbound digital baseband signals (end of para. 55, para. 56);

digital to analog converter module (DACs of fig. 3; 730, 740 of fig. 11) operably coupled to convert the outbound digital baseband signals into outbound analog baseband signals (para. 71); and

a second integrated circuit (1st transceiver IC shown; fig. 9) that includes a first radio section (380, 382, 384, 410, 412, 386, 390, 420, 414, 416, 420; fig. 4) operably coupled to convert the outbound analog baseband signals (analog bb signals at input of 380, 382, 410, 412) into first outbound radio frequency (RFB1 signals of first band) signals (at output of antenna 102; fig. 5) and to convert (via 320, 322, 350, 352) first inbound RF signals (RFB1) into the inbound analog baseband signals (analog bb signals before ADC; end of para. 55) when the wireless communication device is in a first mode of operation (received within first band; para. 48); and

a third integrated circuit (2nd transceiver IC shown; fig. 9) that includes a a second radio section (380, 382, 384, 410, 412, 414, 388, 392, 418, 422) operably coupled to convert the outbound analog baseband signals into second outbound RF signals and to convert second inbound RF signals (RFB2 signals) into the inbound

analog baseband signals when the wireless communication device is in a second mode of operation (received within 2nd band; para. 48).

Regarding claims 5 and 23, Sugar et al disclose the multimode wireless communication device of claims 4 and 21 respectively, wherein the first integrated circuit further comprises: a control interface (control signals to band select switch; fig. 9) operably coupled to the second and third integrated circuits (1st and 2nd radio transceiver IC), wherein the control interface carries control signals to include the first or second mode of operation (1st or 2nd band operation).

Regarding claim 10, Sugar et al disclose the multimode wireless communication device of claim 9, wherein the first integrated circuit further comprises: a control interface (control signals to band select switch; fig. 9) operably coupled to the second integrated circuit (2nd radio transceiver IC), wherein the control interface carries control signals to include the first or second mode of operation (1st or 2nd band operation).

Regarding claims 13, 19 and 27, Sugar et al disclose the multimode wireless communication device of claims 1, 15 and 21 respectively, further comprising the analog to digital converter (14, 16; fig. 3) converting in-phase inbound analog signals into in-phase inbound digital signals and converting quadrature inbound analog signals into quadrature inbound digital signals using alternating two-times oversampling (by alternating I and Q signals using one ADC; end of para. 55); and the digital to analog converter converting in-phase outbound digital signals into in-phase outbound analog signals and converting quadrature outbound digital signals into quadrature outbound analog signals using the alternating two-times oversampling (para. 71).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugar et al (US 2003/0,203,743) in view of Batra et al (US 2005/0,245,199).

Regarding claim 3, the multimode wireless communication device of claim 1, wherein the digital baseband processing module further functions to convert the outbound data into the outbound digital baseband signals and to convert the inbound digital baseband signals into the inbound data processes the inbound and outbound data in accordance with at least one of IEEE 802.11a, IEEE 802.11b, and IEEE 802.11g (para. 53). It would have been obvious to one of ordinary skill in the art at the time the invention was made to process the digital baseband signal using IEEE 802.11 in order to communicate using the preferred communication protocol.

5. Claims 6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugar et al (US 2003/0,203,743) in view of Dixon et al (US 2004/0,216,003).

Regarding claims 6 and 11, Sugar et al disclose the multimode wireless communication device of claims 5 and 10 respectively, wherein the control interface comprises: a 4-wire Joint Test Action Group (JTAG) interface. Sugar et al do not

disclose the control interface comprises: a 4-wire Joint Test Action Group (JTAG) interface (para. 51). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a JTAG control interface in order to provides the mechanism to set bit patterns in configuration registers as suggested by Dixon et al.

6. Claims 12, 18 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugar et al (US 2003/0,203,743) in view of Cheng et al (US 2003/0,078,011).

Regarding claims 12, 18 and 26, Sugar et al disclose the multimode wireless communication device of claims 1, 15 and 21 respectively, where Sugar et al do not disclose the device comprises the analog to digital converter including an in-phase analog to digital converter and a quadrature analog to digital converter; and the digital to analog converter including an in-phase digital to analog converter and a quadrature digital to analog converter. Cheng et al disclose an analog to digital converter (14, 16; fig. 3) including an in-phase analog to digital converter (14) and a quadrature analog to digital converter (16); and a digital to analog converter (34, 36) including an in-phase digital to analog converter (34) and a quadrature digital to analog converter (36) (paras. 35, 37). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have an in phase and quadrature DAC and ADC in order to convert the quadrature signals in separate I and Q channels into digital bits simultaneously.

7. Claims 7-8 and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugar et al (US 2003/0,203,743) in view of Gunzelmann et al (US 2004/0,097,250).

Regarding claims 7 and 24, Sugar et al disclose the multimode wireless communication device of claims 4 and 21 respectively, wherein Sugar et al and the cited prior art fail to disclose the first integrated circuit comprises: first analog to digital integrated circuit connection line coupled to the first radio section (1st radio transceiver IC); second analog to digital integrated circuit connection line coupled to the second radio section (2nd radio transceiver IC), wherein the first analog to digital integrated circuit connection line (ADC of baseband IC; figs. 11, 9) are operably coupled to the second analog to digital integrated circuit (2nd ADC; figs. 11, 4); first digital to analog integrated circuit coupled to the first radio section; and second digital to analog integrated circuit coupled to the second radio section, wherein the second digital to analog integrated circuit connection line are operably coupled to the first digital to analog integrated circuit connection line (see figs. 9 and 11). Sugar et al do not disclose IC pins. Gunzelmann et al disclose digital/analog converters IC pins (para. 6). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have pins connected to the analog/digital converter IC in order to provide a suitable interface between the digital/analog converters and the radio section and the baseband section of the D/A converters as suggested by Gunzelmann et al.

Regarding claims 8 and 25, Sugar et al disclose the multimode wireless communication device of claims 4 and 21 respectively, wherein Sugar et al do not disclose the first integrated circuit comprises: analog to digital integrated circuit pins coupled to the first and second radio sections; and digital to analog integrated circuit pins coupled to the first and second radio sections. Gunzelmann et al disclose a first

integrated circuit (chip) comprises: analog to digital integrated circuit pins coupled to the first and second radio sections; and digital to analog integrated circuit pins (pins of IC digital/analog converters on RF side) coupled to the first and second radio sections (para. 6). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have pins connected to the analog/digital converter IC in order to provide a suitable interface between the digital/analog converters and the radio section and the baseband section of the D/A converters as suggested by Gunzelmann et al.

Allowable Subject Matter

8. Claims 2, 7-8, 14, 16, 20, 22, 24 and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 2, Sugar et al discloses the multimode wireless communication device of claim 1, wherein Sugar et al disclose a diplexer (502) operably coupled to the first antenna (102); a transmit/receive switch (112) operably coupled to the diplexer (502) (fig. 8). However, Sugar et al and the cited prior art fail to disclose the device comprises: a second antenna; a second diplexer operably coupled to the second antenna; a first transmit/receive (T/R) switch operably coupled to the first and second diplexers and to the first radio section, wherein, when the wireless communication device is in the first mode of operation, the first T/R switch provides the first inbound RF

signals from a first selected antenna of the first and second antennas to the first radio section and provides the first outbound RF signals from the first radio section to the first selected antenna; and a second T/R switch operably coupled to the first and second diplexers and to the second radio section, wherein, when the wireless communication device is in the second mode of operation, the second T/R switch provides the second inbound RF signals from a second selected antenna of the first and second antennas to the second radio section and provides the second outbound RF signals from the second radio section to the second selected antenna.

Regarding claim 7, Sugar et al disclose the multimode wireless communication device of claim 4, wherein Sugar et al and the cited prior art fail to disclose the first integrated circuit comprises: first analog to digital integrated circuit pins coupled to the first radio section; second analog to digital integrated circuit pins coupled to the second radio section, wherein the first analog to digital integrated circuit pins are operably coupled to the second analog to digital integrated circuit pins; first digital to analog integrated circuit pins coupled to the first radio section; and second digital to analog integrated circuit pins coupled to the second radio section, wherein the second digital to analog integrated circuit pins are operably coupled to the first digital to analog integrated circuit pins.

Regarding claim 14, Sugar et al disclose the multimode wireless communication device of claim 1, wherein Sugar et al and the cited prior art fail to disclose the digital baseband processing module comprises: a first physical layer corresponding to the first mode of operation and to a third mode of operation; a second physical layer

corresponding to the second mode of operation; physical layer coupling module operably coupled to the first and second physical layers to facilitate the third mode of operation; and a Media-specific Access Control-protocol (MAC) layer operably coupled to first physical layer, the second physical layer and to the physically layer coupling module to facilitate the first, second, and third modes of operation.

Regarding claim 16, Sugar et al discloses the multimode wireless communication device of claim 1, wherein Sugar et al disclose a diplexer (502) operably coupled to the first antenna (102); a transmit/receive switch (112) operably coupled to the diplexer (502) (fig. 8). However, Sugar et al and the cited prior art fail to disclose the device further comprises: a first antenna; a second antenna; a first diplexer operably coupled to the first antenna; a second diplexer operably coupled to the second antenna; a first transmit/receive (T/R) switch operably coupled to the first and second diplexers and to the first radio section, wherein, when the wireless communication device is in the first mode of operation, the first T/R switch provides the first inbound RF signals from a first selected antenna of the first and second antennas to the first radio section and provides the first outbound RF signals from the first radio section to the first selected antenna; and a second T/R switch operably coupled to the first and second diplexers and to the second radio section, wherein, when the wireless communication device is in the second mode of operation, the second T/R switch provides the second inbound RF signals from a second selected antenna of the first and second antennas to the second radio section and provides the second outbound RF signals from the second radio section to the second selected antenna.

Regarding claims 20 and 28, Sugar et al disclose the multimode wireless communication device of claims 15 and 21 respectively, wherein Sugar et al and the cited prior art fail to disclose the digital baseband processing module comprises: a first physical layer corresponding to the first mode of operation and to a third mode of operation; a second physical layer corresponding to the second mode of operation; physical layer coupling module operably coupled to the first and second physical layers to facilitate the third mode of operation; and a Media-specific Access Control-protocol (MAC) layer operably coupled to first physical layer, the second physical layer and to the physically layer coupling module to facilitate the first, second, and third modes of operation.

Regarding claim 22, Sugar et al disclose the multimode wireless communication device of claim 1, wherein Sugar et al disclose a diplexer (502) operably coupled to the first antenna (102); a transmit/receive switch (112) operably coupled to the diplexer (502) (fig. 8). However, Sugar et al and the cited prior art fail to disclose the multimode wireless communication device of claim 21 further comprises: a first antenna; a second antenna; a first diplexer operably coupled to the first antenna; a second diplexer operably coupled to the second antenna; a first transmit/receive (T/R) switch operably coupled to the first and second diplexers and to the first radio section, wherein, when the wireless communication device is in the first mode of operation, the first T/R switch provides the first inbound RF signals from a first selected antenna of the first and second antennas to the first radio section and provides the first outbound RF signals from the first radio section to the first selected antenna; and a second T/R switch

operably coupled to the first and second diplexers and to the second radio section, wherein, when the wireless communication device is in the second mode of operation, the second T/R switch provides the second inbound RF signals from a second selected antenna of the first and second antennas to the second radio section and provides the second outbound RF signals from the second radio section to the second selected antenna.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lana N. Le whose telephone number is (571) 272-7891. The examiner can normally be reached on M-F 9:30-18:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward F. Urban can be reached on (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Lana Le

Lana N. Le
7-06-06

LANA LE
PRIMARY EXAMINER